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## ABSTRACT OF THE DISCLOSURE

This invention provides methods and apparatus for detecting and quantifying particulate matter suspended in a fluid. Specifically, the invention provides an integrated, affinity-binding based, analytical system comprising a platform for performing an affinity-binding based assay  
5 for specifically binding particulates including microbial cells, and a detection means for detecting the particulates specifically bound to a defined surface or chamber comprising the platform. Methods for using the analytical systems of the invention are also provided.